ANNUAL REPORT 1964

GALT

water pollution control plant

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SEP 13 1965
ONTARIO WATER RESOURCES COMMISSION

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DIVISION OF PLANT OPERATIONS

Ontario Water Resources Commission

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ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Galt Local Advisory Committee,
City of Galt.

Gentlemen:

We are pleased to provide you with the 1964 Operating Report for the Galt Water Pollution Control Plant, OWRC Project No. 61-S-90.

By continuing the mutual cooperation which has existed in the past, we can look forward to greater progress in the field of water pollution control.

Yours very truly,

D. S. Caverly,
General Manager

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General Manager,
Ontario Water Resources Commission.

Dear Sir:

It is with pleasure that I present to you the Annual Report of the operation of the Galt Water Pollution Control Plant, OWRC Project No. 61-S-90 for 1964.

This report presents design data, outlines operating problems encountered and summarizes in tables, charts and graphs all significant flow and cost data.

Yours very truly,

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

This report describes the operation of this project for the year 1964. It includes a detailed description of the project, summary of operation, graphs and charts showing quality and quantity information, and project cost data.

This information will be of value to the municipality in assessing the adequacy of the works in meeting existing requirements and in projecting its capability to meet future expected demands. The cost information will be of particular interest to those concerned with developing and maintaining revenue structures.

The preparation of this report has been a cooperative effort of several groups within the Division of Plant Operations. These include the Statistical Section, Brochures Officer and the Regional Supervisor. However, the primary responsibility for the content has been with the Regional Operations Engineer. He will be pleased to discuss all aspects of this report with the municipality.

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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GALT
water pollution control plant

operated for

THE CITY OF GALT

by the

ONTARIO WATER RESOURCES COMMISSION

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DIRECTOR: B. C. Palmer

Assistant Director: **C. W. Perry**
Regional Supervisor: **D. A. McTavish**
Operations Engineer: **B. G. Porter**

801 Bay Street **Toronto 5**

'64 REVIEW

This report gives in detail the significant data on the operation of the various treatment units at the Galt Water Pollution Control Plant.

The plant has not performed as well as would be expected with the organic loading entering the plant; however, problems with many pieces of equipment have contributed to this performance.

The flow through the plant has average 5.192 mgd per day, or greater than the design flow. The flows during 1965 will give a more accurate value of the hydraulic loading at the plant.

Due to problems encountered with gas leaks in the primary digester roof, this unit was not used. It is expected to be in full operation in 1965. During this period, raw sludge instead of digested sludge was filtered in the vacuum filters.

It is hoped that most of the operating problems at the plant will be solved during 1965.

GLOSSARY

BOD	biochemical oxygen demand (a measure of organic content)
cfm	cubic feet per minute
comminution	shredding of solids into small fragments
DWF	dry weather flow
effluent	outflow
flocculation	bringing very small particles together to form a larger mass (the floc) before settling
fps	feet per second
gpcd	gallons per capita per day
gpm	gallons per minute
grit	sand, dust, stones, cinders and other heavy inorganic material
influent	inflow
lin. ft.	lineal feet
mgd	million gallons per day
mlss	mixed liquor suspended solids
ppm	parts per million
ss	suspended solids
TDH	total dynamic head (usually refers to pressure on a pump when it is in operation)

HISTORY
1961 - 1964

INCEPTION

In 1961, the City of Galt and the Ontario Water Resources Commission initiated plans to provide secondary treatment additions to the Galt Water Pollution Control Plant.

The firm of Proctor and Redfern, Toronto, Ontario, Consulting Engineers was engaged to prepare plans and specifications for the project.

APPROVAL

On June 15, 1961, the Ontario Municipal Board granted approval for the plant extensions and the city signed an agreement with the Ontario Water Resources Commission on October 26, 1961, to finance, construct and operate the plant.

CONSTRUCTION

Louis Donolo (Ontario) Limited, Toronto, Ontario, began construction in November 1961 and by July of 1963, the Division of Plant Operations assumed the responsibility of operating the new plant.

TOTAL COST

$407,139



A. B. McEWEN
CHIEF OPERATOR

Project Staff

Operators

F. Angus
D. Munro
F. MacKay
A. Rooke
L. Ward

Groundsman/Operator: R. Norsic

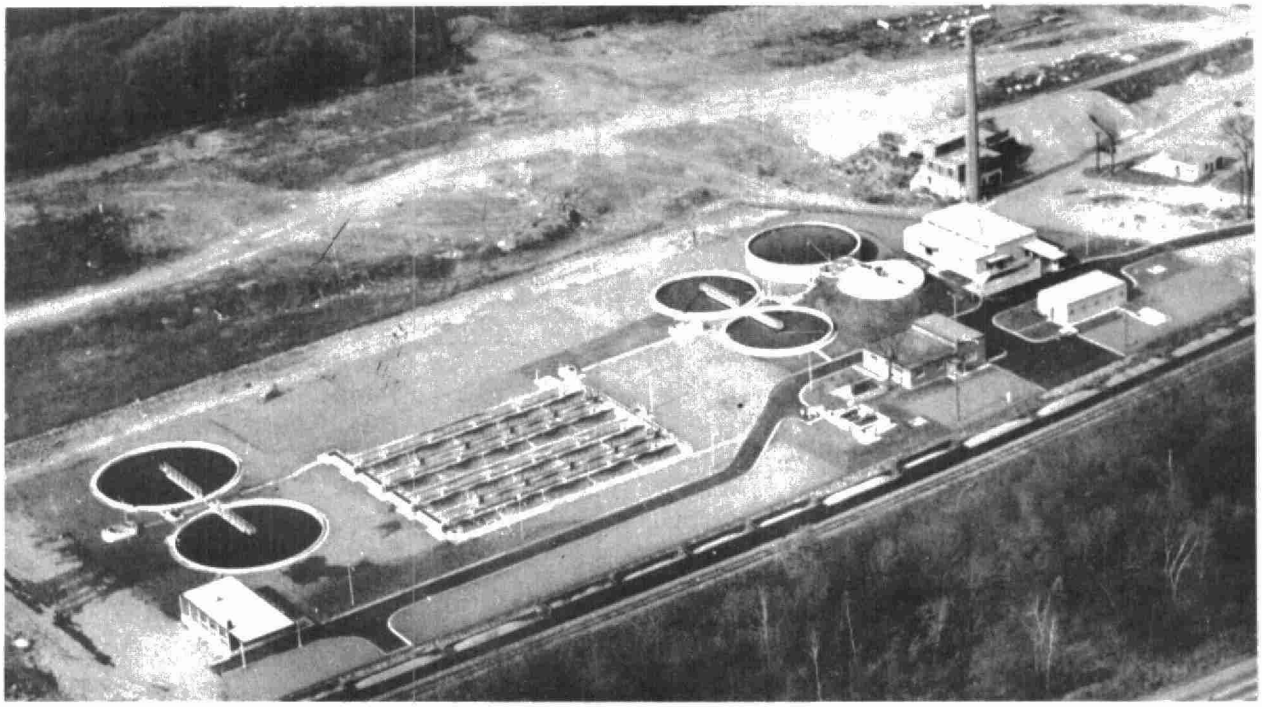
COMMENTS

The plant is staffed between the hours of 7 a.m. and 11 p.m. seven days per week. Each man works a 40 hour week.

A casual labourer was employed from September 22, until the end of the year to assist with extra work and to permit the regular operators to take off their accumulated overtime.

Mr. McEwen received his Certificate of Qualification as a Water Pollution Control Works Operator in 1963 after successfully completing a series of three one week duration courses of instruction sponsored by the OWRC.

Mr. D. Munro received his Certificate of Qualification as a Water Pollution Control Plant operator in December 1964.



Description of Project

INFLUENT WORKS

The influent flow is collected by a 54 inch diameter sanitary trunk sewer which connects to the overflow control chamber. The chamber is divided into two compartments. From the first compartment the sewage flows to the pumping station via a 36 inch diameter pipe controlled by an automatic sluice gate. The excess sewage during an extremely high flow period flows over a weir to the second compartment from where a 54 inch diameter plant bypass sewer conveys it to the Grand River. The flow entering the pumping station flows through a 36 inch barminutor which is mechanically cleaned bar screen equipped with a shredding drum to cut the screenings and return them to the main flow. The sewage then passes through a Parshall flume which measures, indicates and records the flow. It then enters the raw sewage wet well where it is lifted to the detritor. From this point the flow through the remainder of the plant is by gravity. The detritor is a mechanical grit removal unit. As the sewage flows through this unit, the grit settles and, is collected, washed and dried and is buried on the plant grounds.

PRIMARY CLARIFICATION

Two circular concrete clarifiers, each 60 feet in diameter receive the flow from the detritor. As the sewage flows through these units the heavier particles settle to the bottom and the lighter objects and grease rise to the surface. Each clarifier is provided with circular sludge collector mechanisms which move the bottom raw sludge to a central draw-off point

and the surface scum to collector hoppers beside the tank. Both raw sludge and scum are then pumped to the primary digester or vacuum filter.

AERATION

The primary clarifier effluent is then directed to the aeration section which has four single pass tanks, that are divided into five cells each. Each cell is equipped with one Ames Crosta 'Simplex" mechanical aerator, a total of 20 for the plant. The tanks, continually seeded with activated sludge settled in the final tanks, provide the environment where, through biological action, the finely divided, suspended and colloidal particals are oxidized. These particles are normally referred to as BOD and Suspended Solids.

FINAL CLARIFIERS

The aeration tank effluent containing a high concentration of activated sludge is then directed to the final clarifiers where the activated sludge settles rapidly to the bottom. A clear supernatant or effluent is discharged to the chlorination tank. The activated sludge is collected from the bottom and returned to the aeration section. Excess activated sludge is wasted to the primary clarifiers where it is removed along with the raw sludge.

CHLORINATION

The plant effluent is retained for approximately 15 minutes after chlorination in order to provide enough time for disinfection to take place. A residual of 0.5 ppm of chlorine is maintained in the effluent being discharged to the river.

SLUDGE DIGESTION TANKS

One primary digestion tank and one secondary digestion tank are used at this plant. The primary tank was part of the original plant.

The primary tank receives combined raw sludge, waste activated sludge and scum from the primary clarifiers. This tank has a fixed, gas tight concrete roof with gas collection piping. The sludge in the primary digester is heated by a boiler and heat exchanger that is fueled by gas produced in the digesters.

Mixers continually keep the primary digested sludge in suspension.

The secondary tank, constructed as part of the plant extension is used to complete the final stages of anaerobic digestion and to settle the digested sludge. The sludge in this digester is unheated and unmixed. The supernatant is returned to the aeration tanks.

VACUUM FILTER

Digested sludge from the secondary digester or raw sludge from the primary clarifiers is pumped to a 380 sq. ft. vacuum filter. Lime and ferric chloride are added to the sludge to affect coagulation.

The filter drum is placed under a vacuum and moisture is withdrawn from the sludge. The drum continuously rotates through a hopper containing the sludge, and the filtered sludge is dropped onto a conveyor lift for removal.

Appurtenances included with the filter are vacuum pumps, filtrate return pumps, lime and ferric chloride pumps, a mixing tank and sludge pumps. The filtrate is returned to the main sewage flow for retreatment.

PROJECT COSTS

LONG TERM DEBT TO OWRC:	$407,139.00

The total cost to the municipality during 1964 was as follows:

Net Operating	$ 77,875.88
Debt Retirement	23,098.08
Reserve	9,308.00
Interest Charged	19,350.49
TOTAL	$129,632.45

RESERVE ACCOUNT

Balance at January 1, 1964	$ 4,686.78
Deposited by municipality	9,308.00
Interest	451.72
	$ 14,446.50
Less Expenditures	-
Balance at December 1, 1964	$ 14,446.50

MONTHLY COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	*SUNDRY	WATER
JAN	3494.74	2345.70		429.26		449.92	84.10	38.93		146.83	
FEB	5552.60	2434.00			725.11	1633.93	90.95	308.43	16.47	187.84	155.87
MARCH	5276.77	2449.49		552.53	789.22	431.92	103.89	45.73	511.23	212.12	180.64
APRIL	10,598.54	2474.88		230.40	631.80	6994.12	109.93		17.60	49.60	90.21
MAY	8439.15	3639.51		432.00	623.41	1704.69	386.21	34.60	807.81	698.46	112.46
JUNE	5469.19	2631.90			565.20	1859.55	72.38	77.50	15.80	88.54	158.32
JULY	7729.03	2426.34	182.34	183.17	565.20	1894.94	67.88	160.54	355.77	1785.79	107.06
AUG	3710.15	2426.34	231.00	115.20	545.49		158.60	9.60	39.79	86.58	97.55
SEPT	(679.59)	2437.39	181.73		576.73	(4529.96)	44.28	76.22		436.04	97.98
OCT	15,851.07	2895.00	427.65		642.27	8349.88	398.59	88.55	240.42	2713.89	94.82
NOV	5317.40	2920.31			572.23	446.34	132.48	35.59	804.96	41.35	84.16
DEC	7,116.83	3639.51	415.52	608.28	1453.06	(324.23)	143.18	85.44	623.16	388.98	83.93
TOTAL	77875.88	32720.37	1718.22	2550.84	7689.72	18,911.10	1792.47	961.13	3433.01	6836.02	1263.00

* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $ 2,693.40

BRACKETS INDICATE CREDIT

YEARLY COSTS

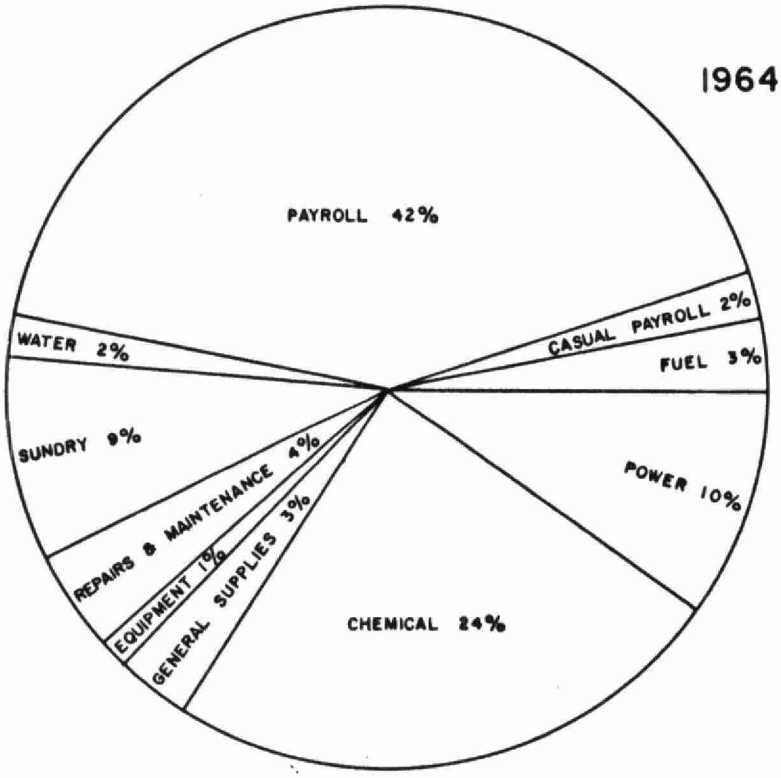
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1964	1895.161	$77,875.88	$10.57	$41.09	3 CENTS

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

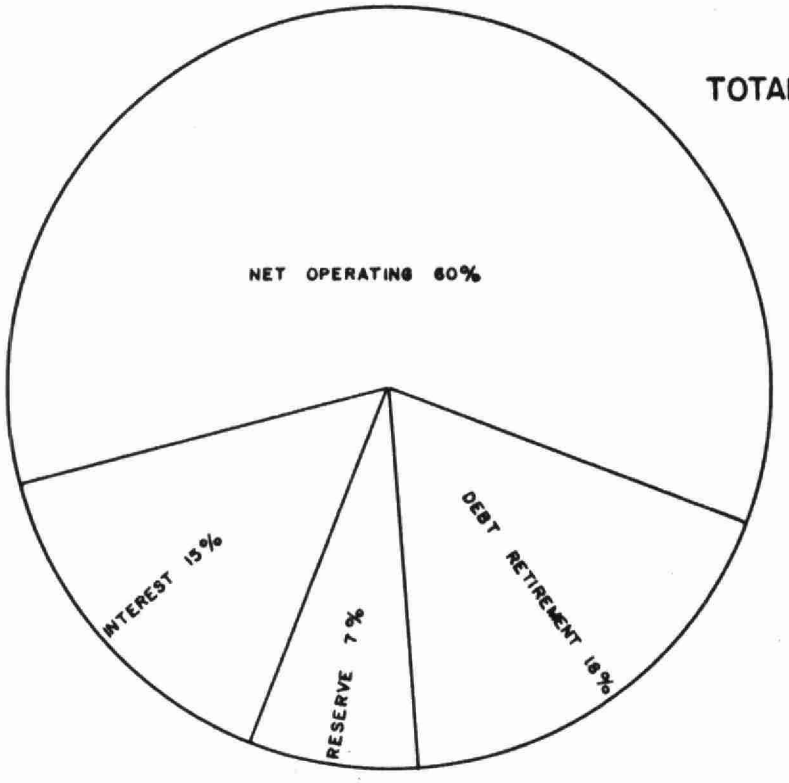
VACUUM FILTER COSTS

MONTH	COST PER MONTH					TOTAL	COST PER TON DRY WEIGHT					TOTAL
	$FeCl_3$	LIME	LABOUR	ELEC	MAINT		$FeCl_3$	LIME	LABOUR	ELEC	MAINT	
JANUARY	709.41	351.59	286.36	95.98	90.90	1534.24	7.39	3.66	2.98	1.00	0.92	15.98
FEBRUARY	570.57	287.88	286.36	46.34	90.91	1282.06	12.31	6.21	6.18	1.00	1.96	27.67
MARCH	317.98	170.29	286.36	36.08	90.91	901.62	8.81	4.72	7.94	1.00	2.52	24.99
APRIL	792.16	382.92	286.36	98.79	90.91	1651.14	8.02	3.88	2.90	1.00	0.92	16.71
MAY	964.47	375.25	286.36	126.95	90.91	1843.94	7.60	2.96	2.26	1.00	0.72	14.53
JUNE	568.16	276.99	286.36	59.82	90.91	1300.24	9.50	4.63	4.79	1.00	1.52	21.74
JULY	629.07	297.50	286.36	70.90	90.91	1374.74	8.87	4.20	4.04	1.00	1.28	19.39
AUGUST	105.43	58.62	286.37	13.86	90.91	555.19	7.61	4.23	20.66	1.00	6.56	40.06
SEPTEMBER	485.42	245.00	286.37	52.13	90.91	1159.83	9.31	4.70	5.49	1.00	1.74	22.25
OCTOBER	90.74	55.56	286.37	11.42	90.91	535.00	7.95	4.87	25.08	1.00	7.96	46.86
NOVEMBER	-	-	-	-	-	-	-	-	-	-	-	-
DECEMBER	219.44	126.00	286.37	14.70	90.91	737.42	14.93	8.57	19.48	1.00	6.18	50.17
TOTAL	5470.85	2627.60	3150.00	626.97	1000.00	12,875.42						
AVERAGE PER MONTH	495.71	238.87	286.36	57.00	90.91	1170.49	8.73	4.19	5.02	1.00	1.59	20.54

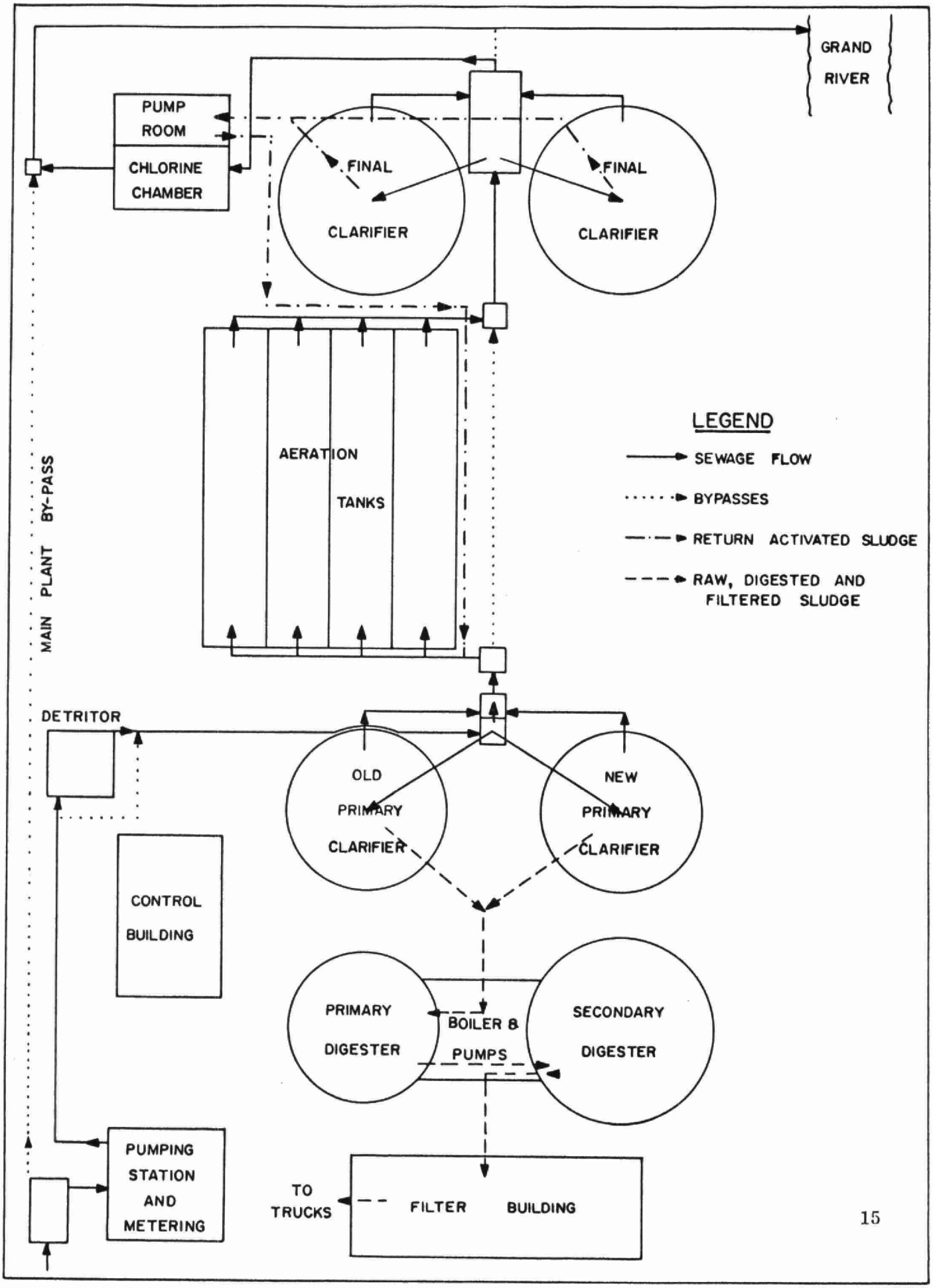
1964 OPERATING COSTS



TOTAL ANNUAL COST



Technical Section


GRAND RIVER
PUMP ROOM
CHLORINE CHAMBER
FINAL CLARIFIER
FINAL CLARIFIER
AERATION TANKS
MAIN PLANT BY-PASS
LEGEND
SEWAGE FLOW
BYPASSES
RETURN ACTIVATED SLUDGE
RAW, DIGESTED AND FILTERED SLUDGE
DETRITOR
OLD PRIMARY CLARIFIER
NEW PRIMARY CLARIFIER
CONTROL BUILDING
PRIMARY DIGESTER
BOILER & PUMPS
SECONDARY DIGESTER
PUMPING STATION AND METERING
TO TRUCKS
FILTER BUILDING

Design–Data

GENERAL

Type of Plant - Activated sludge

Design Population - 34,000

Per Capita Flow - 147 gallons per day.

Design Plant Flow - 5.0 mgd

Five Day BOD

Raw Sewage - 250 ppm

Removal - 90%

Suspended Solids

Raw Sewage - 250 ppm

Removal - - 95%

INFLUENT SEWER

54 inch diameter

OVERFLOW CONTROL CHAMBER

Two compartments; 36 inch diameter automatic sluice gate.

RAW SEWAGE PUMPS

3 Babcock-Wilcox, Goldie McCulloch pumps, each with a capacity of 3500 gpm at 30 ft. head. Two pumps, equipped with 50 hp wound rotor motors controlled with a variable speed controller, one with a 50 hp squirrel cage motor.

PRIMARY TREATMENT

Screening

1 Chicago Pump Model C Barminutor, 36 inch screen equipped with a differential controller. The barminutor bypass channel is equipped with manually cleaned bar screen.

Parshall Flume

18 inch throat

Grit Removal

One detritor - Eimco mechanism

Size - 18 ft. x 18 ft. x 2 ft.

Volume - 4,000 gallons

Detention period - 1.15 min. at design flow.

Primary Clarification

Type - Two concrete circular structures, one existing. Existing clarifier equipped with Dorr sludge collection mechanism, the other with an Eimco mechanism.

Size 60 ft. diameter x 9 ft. SWD.

Volume - 157,500 gallons each. . Total volume 315,000 gallons (50,600 cu. ft.)
Detention Period - 1.5 hours @ design flow.
Surface Settling Rate - 884 gallons per sq. ft. per day @ design flow.
Weir Overflow Rate - 13,250 gallons per lin. ft. weir per day @ design flow.

SECONDARY TREATMENT

Aeration Section

Four single pass tanks. Each pass divided into 5 cells.'

Ames Crosta 'Simplex"mechanical aerators - 20, 1 per cell.

Size - each cell 30 ft. x 30 ft. x 13.74 ft.
Total aeration volume - 1,460,000 gallons .
Detention period - 7 hours @ design flow.

Return sludge capacity 70% of design flow.

FINAL CLARIFICATION

Type - two concrete circular structures equipped with Eimco sludge collection mechanism.
Size - 75 diameter x 10 SWD.
Volume - 225,000 gallons each. Total volume - 550,000 gallons (88,400 cu. ft.)
Detention Period - 2.64 hours at design flow.
Surface Settling Rate - 566 gallons per sq. ft. per day @ design flow.

Weir Overflow Rate - 10,600 gallons per lin. ft. weir per day @ design flow.

CHLORINATION

Type - one concrete unit, baffled, rectangular.
Size - 49.75 ft. x 21.5 ft. x 7.25 ft.
Volume - 46,000 gallons (7,372 cu. ft.)
Contact period - 13.25 minutes at design flow
Chlorinator - one Fisher and Porter unit fully automatic or manual.
Effluent - discharged directly to the Grand River.

SLUDGE TREATMENT

Digestion

Two stage, one concrete fixed roof primary digester equipped with two Eimco draft tube mixers and one steel floating roof secondary digester.

Size of Primary digester - 50 ft. diameter x 20 ft. SWD.

Volume of Primary digester - 30,300 cu. ft.
Size of Secondary digester - 70 ft. diameter x 20 ft. SWD.

Volume of Secondary digester - 77,000 cu. ft.
Total Capacity - 3.42 cu. ft. per capita.

VACUUM FILTER

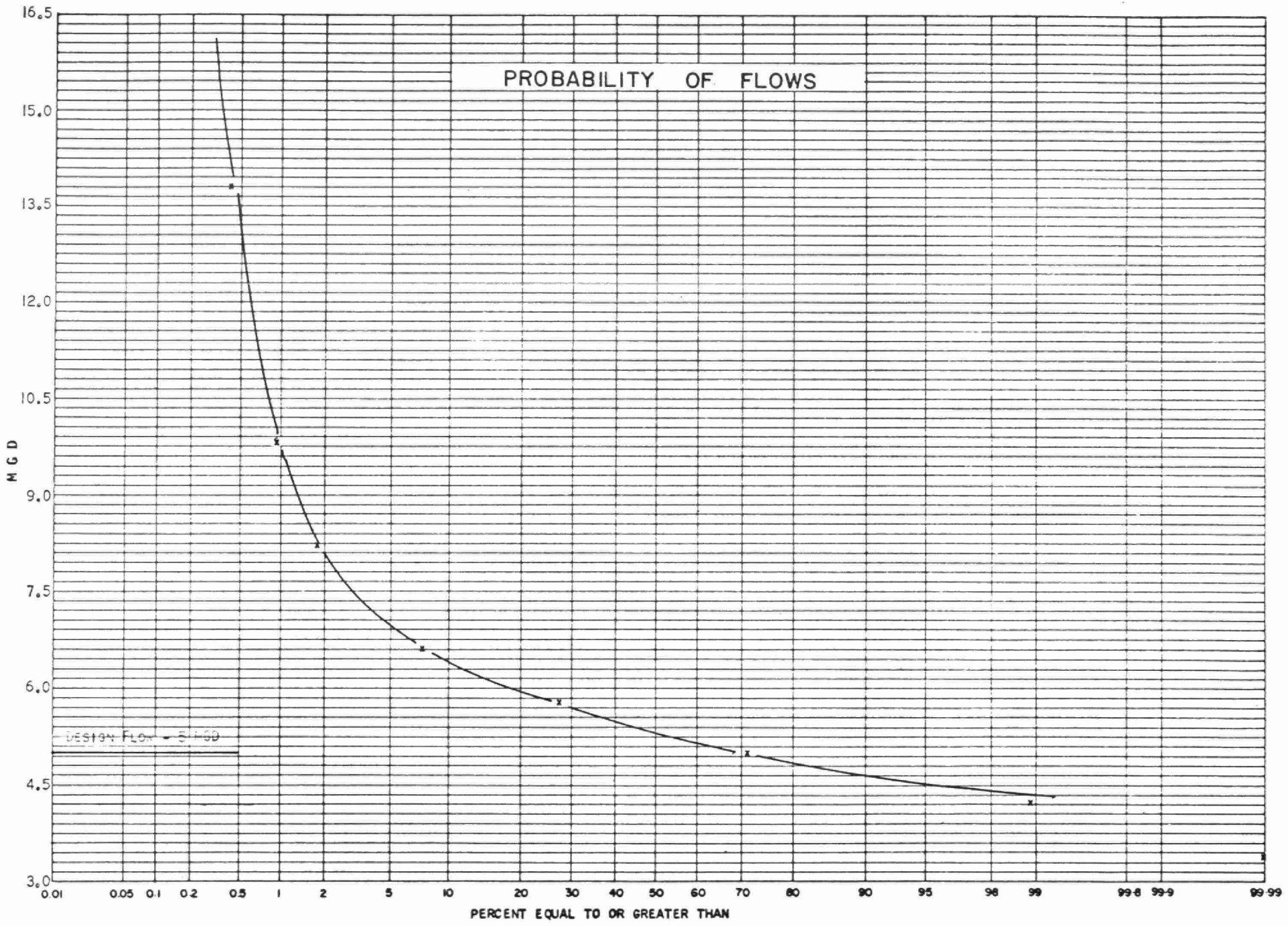
One Eimco cloth belt type vacuum filter with 380 sq. ft. surface area.

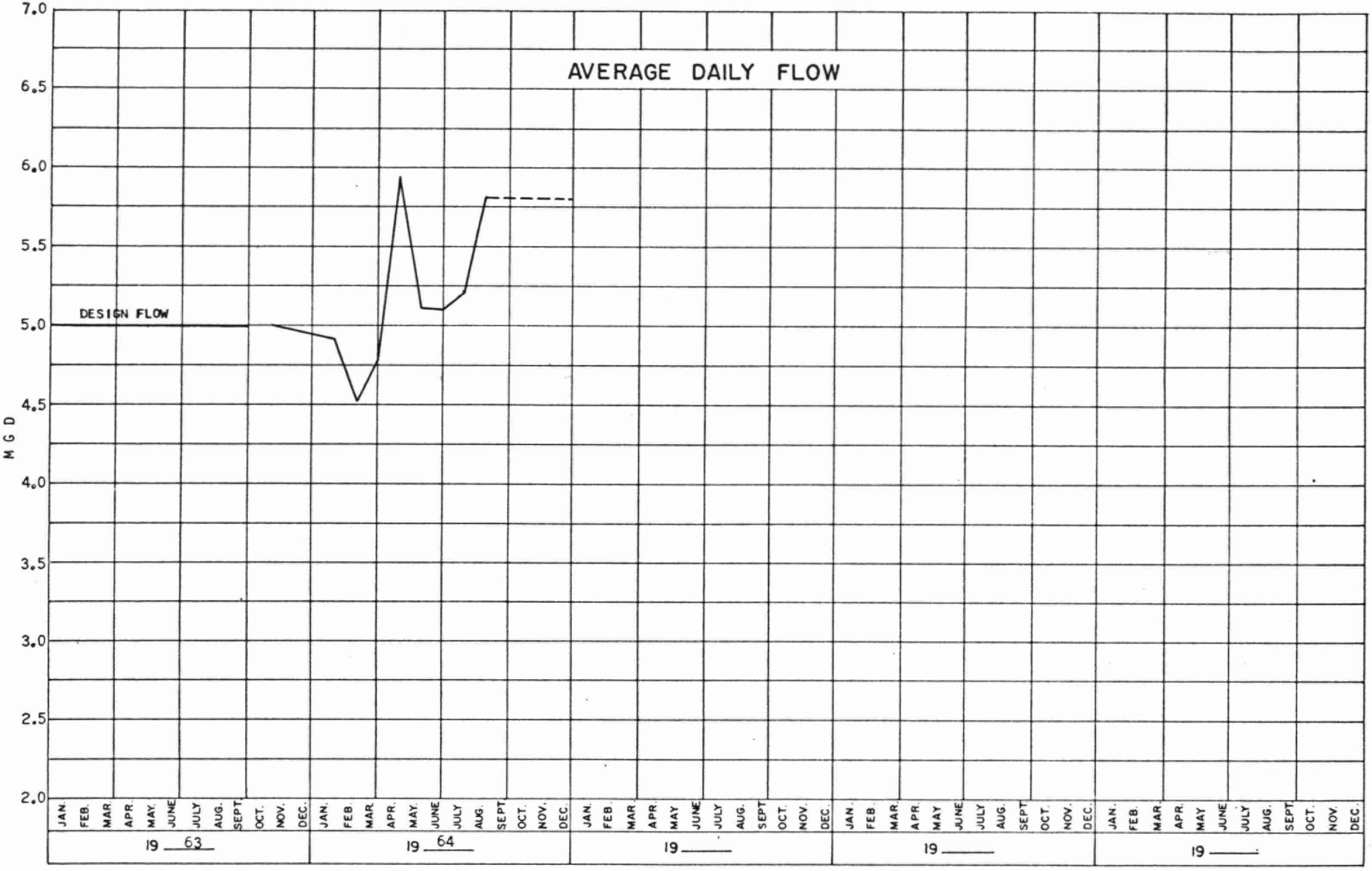
Digested or raw sludge may be filtered.

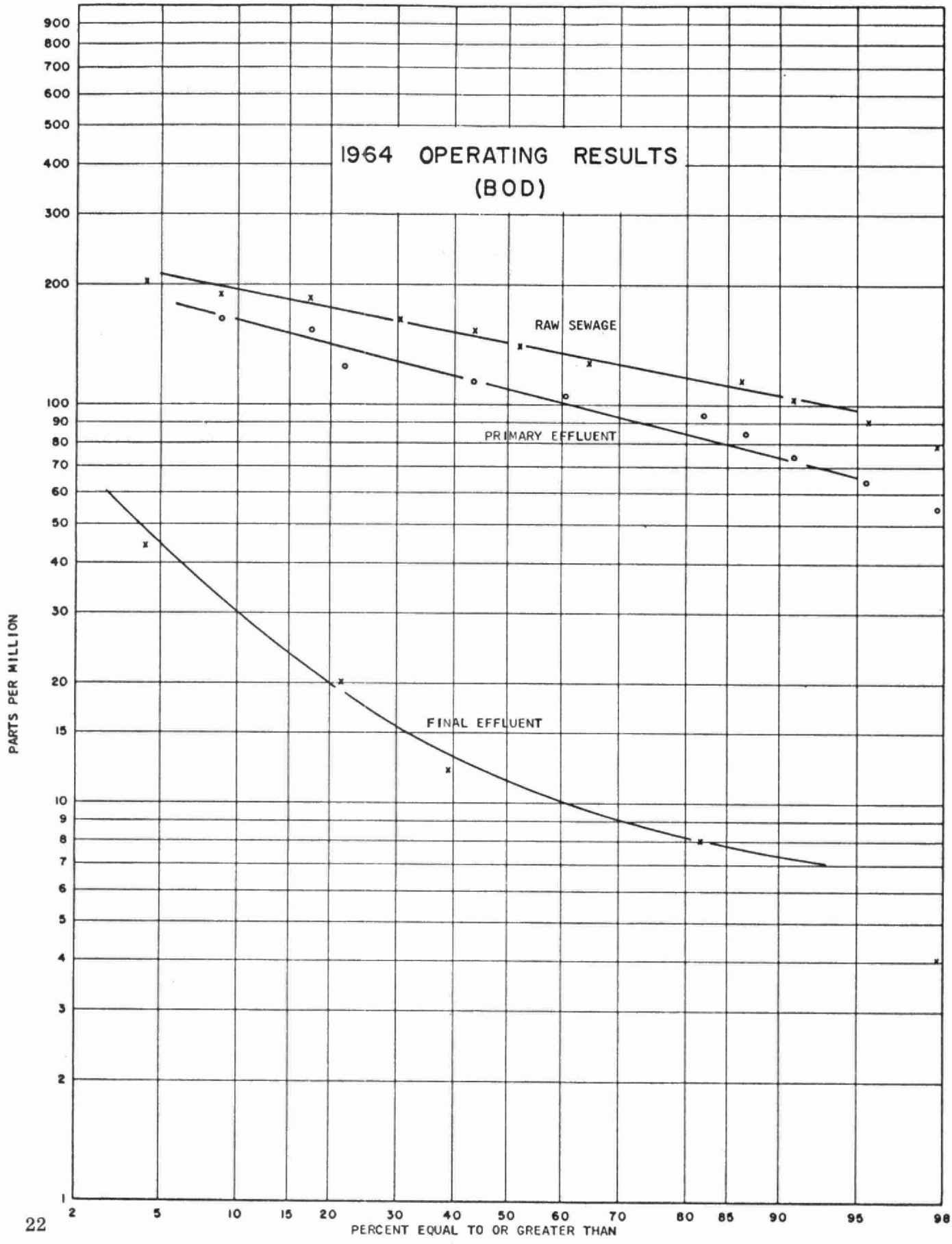
The filtered sludge is removed from the site by truck.

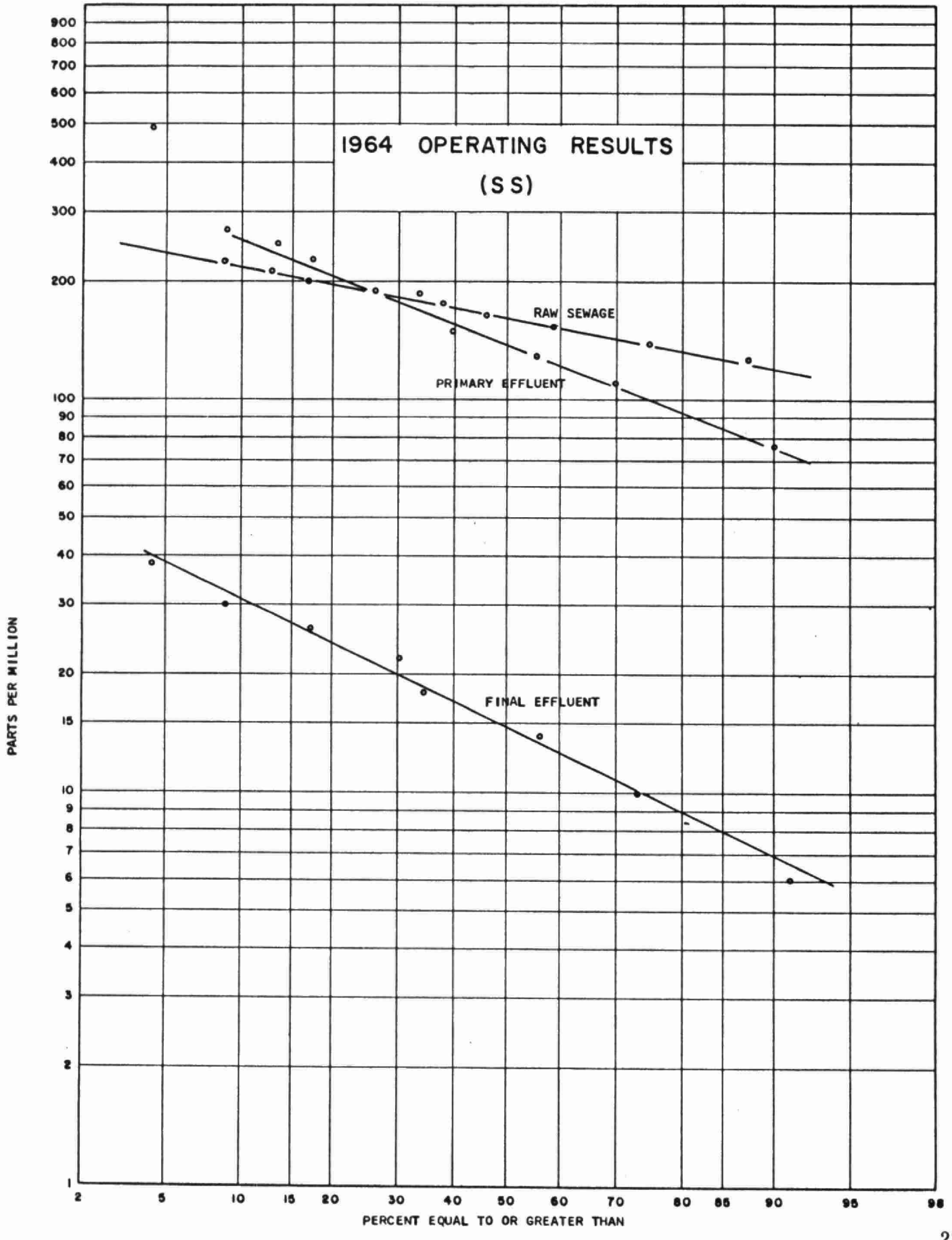
Process Data

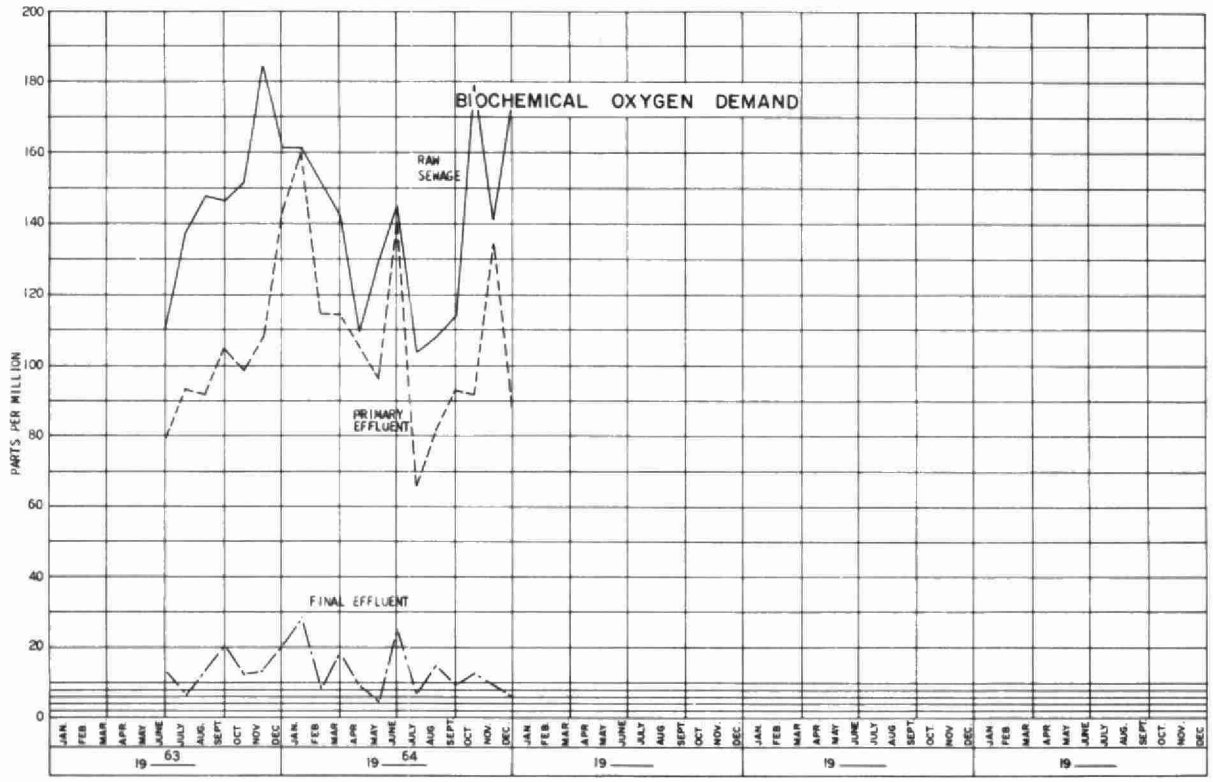
Flow data for this plant is incomplete owing to problems encountered with the flow meter and raw sewage pumps. Detailed flows will be available in 1965 when corrections to the equipment are made. The rapid upward turn in the probability of flow chart is probably the result of high storm flows, but may also partly result from the problems encountered with the flow meter. The flows as measured, exceeded the design flow 50% of the time.


PROBABILITY OF FLOWS
16.5
15.0
13.5
12.0
10.5
9.0
7.5
6.0
4.5
3.0
M G D
DESIGN FLOW = 5 MGD
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
PERCENT EQUAL TO OR GREATER THAN

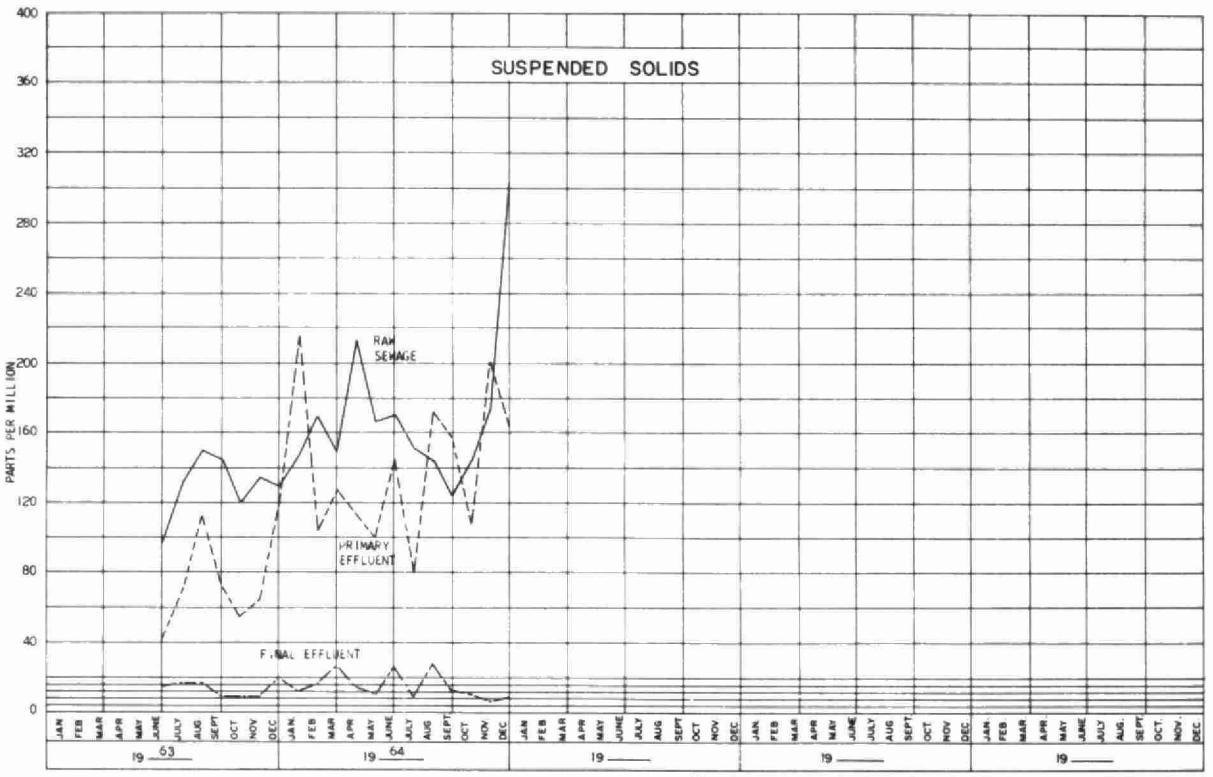

AVERAGE DAILY FLOW
DESIGN FLOW
M G D
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT OCT. NOV. DEC.
19 63
19 64
19 ____


1964 OPERATING RESULTS
(BOD)
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT
PARTS PER MILLION
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
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PERCENT EQUAL TO OR GREATER THAN


1964 OPERATING RESULTS
(S S)
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT
PARTS PER MILLION
PERCENT EQUAL TO OR GREATER THAN
900
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MONTHLY VARIATIONS



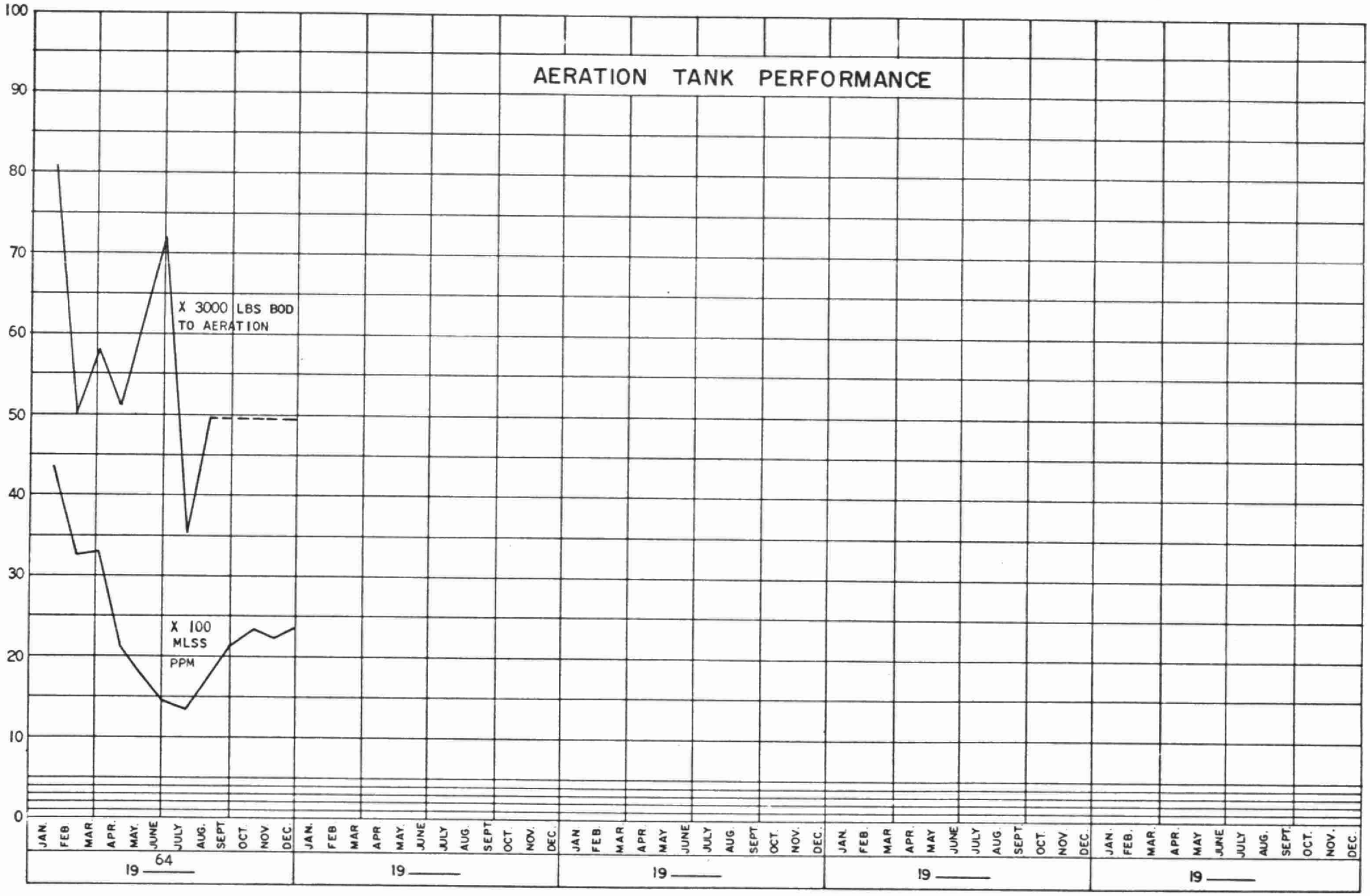
GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	162	28	82.5	102.2	147	12	92	103	40.5
FEB.	152	8	94.5	94.8	170	16	90.5	101.4	-
MAR.	143	18	87.5	93.1	150	26	82.5	92.4	-
APR.	110	9.2	91.5	89.5	214	14	93.5	177.7	-
MAY	130	4.2	96.5	99.7	164	10	94	122.1	12
JUNE	145	22.1	84.5	94.2	171	26	84.5	111.1	12
JULY	104	6.3	94.0	79.0	152	9	94.0	115.6	12
AUG.	108	14.4	86.5	84.6	145	26	82.0	107.6	11
SEPT.	114	8.9	92.0	81.3	124	12	90.5	86.8	39
OCT.	180	12	93.5	134.5	144	10	93.0	107.3	3
NOV.	142	9	93.5	103.0	174	6	96.5	130.1	8
DEC.	177	6	96.5	136.9	306	8	97.5	238.5	3
TOTAL	-	-	-	1201.5	-	-	-	1487.7	140.5
AVG.	139	12.2	91.0	100.5	172	15	91.0	124.0	12

COMMENTS

The probability graphs of concentrations of BOD and Suspended Solids in the raw sewage are less than the design values most of the time. The BOD of the final effluent exceeded the commission objective of 15 ppm 30% of the time and the suspended solids exceeded the same objective nearly 50% of the time. The average values of 12.2 for BOD and 15 for suspended solids in the final effluent just meet the commission standards.

The average value of 12 cubic feet per month for grit removal seems rather low for a plant of this size.


AERATION TANK PERFORMANCE
X 3000 LBS BOD TO AERATION
X 100 MLSS PPM
100
90
80
70
60
50
40
30
20
10
0
JAN. FEB MAR APR. MAY. JUNE JULY AUG. SEPT OCT. NOV DEC.
19 64
19 ____
19 ____
19 ____
19 ____

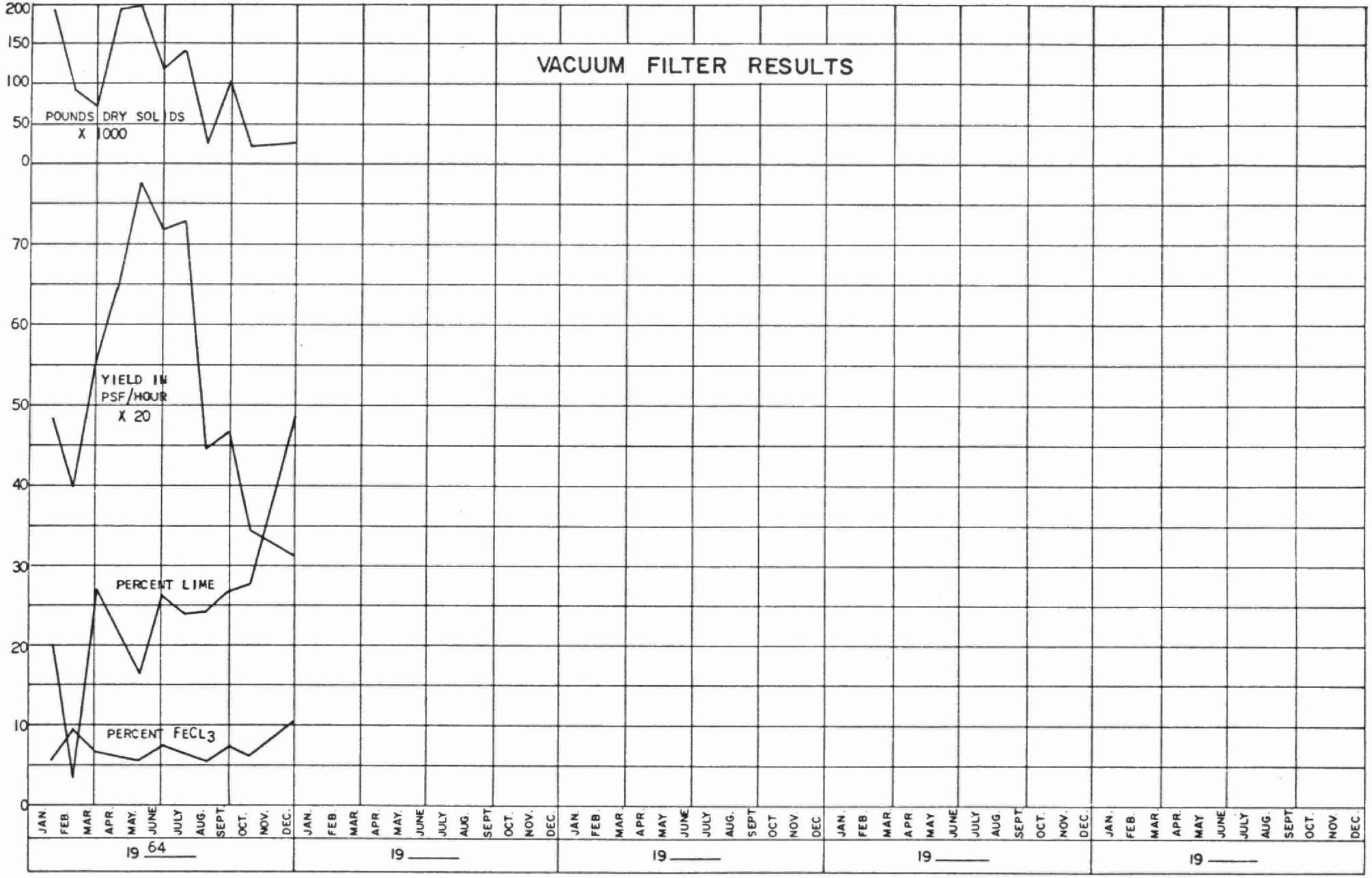
AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	160	4443	12	-
FEBRUARY	115	3214	11	-
MARCH	115	3274	13	-
APRIL	*	2088	-	-
MAY	97	1795	17	-
JUNE	142	1442	34	-
JULY	66	1345	18	-
AUGUST	82	1703	26	-
SEPTEMBER	93	2133	-	-
OCTOBER	92	2352	-	-
NOVEMBER	135	2250	-	-
DECEMBER	88	2388	-	-
TOTAL	-	-	-	-
AVERAGE	108	2369	19	-

* SAMPLE BROKEN

COMMENTS

The aeration loadings indicate an average primary reduction in BOD of about 22%. The aeration loading of 19 pounds of BOD per 100 pounds MLSS is on the low side of the range of 20 to 40 pounds of BOD per 100 pounds MLSS that is usually specified. The plant utilizes mechanical aeration, therefore the air supply cannot be directly measured.


VACUUM FILTER RESULTS
POUNDS DRY SOLIDS X 1000
YIELD IN PSF/HOUR X 20
PERCENT LIME
PERCENT FECL3
200
150
100
50
0
70
60
50
40
30
20
10
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.
19 64
19 ____
19 ____
19 ____
19 ____

VACUUM FILTER OPERATION

MONTH	FILTER HOURS		% SOLIDS DIGEST SLUDGE	LBS. DRY SOLIDS FILTERED	LBS. LIME	% LIME	LBS. $FeCl_3$	% $FeCl_3$	% SOLIDS FILTERED SLUDGE	YIELD PSF/HOUR
	#1	#2								
JAN.	207.25	-	3.97	191965	40183	20.9	10914	5.68	41.2	2.41
FEB.	115.50	-	3.80	92681	32900	3.6	8778	9.47	27.2	1.98
MAR.	70.00	-	4.97	72154	19462	27.0	4892	6.78	25.2	2.76
APR.	154.00	-	5.46	197576	43763	22.1	12187	6.17	28.5	3.26
MAY.	145.00	-	6.66	253893	42886	16.9	14838	5.84	24.0	3.86
JUNE	99.00	-	5.43	119642	31655	26.4	8741	7.30	23.4	3.20
JULY	115.50	-	5.65	141809	34000	24.0	9678	6.82	24.2	3.25
AUG.	31.00	-	4.20	27716	6700	24.2	1622	5.82	25.2	2.23
SEPT.	120.00	-	4.40	104263	28000	26.8	7468	7.16	24.4	2.34
OCT.	30.00	-	5.44	22834	6350	27.8	1396	6.11	27.5	1.72
NOV.	* -	-	-	-	-	-	-	-	-	-
DEC.	46.00	-	4.10	29398	14400	49.0	3376	11.50	23.0	1.56
TOTAL	1133.25	-	-	1253931	300299	-	83890	-	-	-
AVG.	103.02	-	4.92	113994	27300	24.4	7626	7.15	26.7	2.60

COMMENTS

No filtering was done during the month of November. Dosage of lime in this process is unusually high, the normal percentage being 10 to 15%. Investigations of the equipment will be made in order to reduce this consumption. The total estimated cost of operation of the vacuum filter and filtered sludge haulage is approximately $15,570.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	152.520	4309	2.82
FEBRUARY	131.678	4485	3.41
MARCH	148.953	5391	3.62
APRIL	177.665	5735	3.23
MAY	158.519	5815	3.67
JUNE	153.241	5540	3.61
JULY	161.714	5550	3.43
AUGUST	180.854	5630	3.11
SEPTEMBER	* 154.920	5524	3.56
OCTOBER	* 110.084	5555	3.47
NOVEMBER	* 154.929	5545	3.58
DECEMBER	* 160.084	6081	3.80
TOTAL	1895.161	65160	
AVERAGE	157.930	5430	3.44

* prorated

COMMENTS

The chlorine dosage rate is based on the amount of chlorine necessary to maintain a residual of 0.5 ppm after 15 minutes of contact time. The dosage rate is comparable to those at other plants.

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TD227/G35/W38/1964/MOE
Ontario Water Resources Co
Galt water pollution
control plant : annual aswu
report 1964 c.1 a aa

Etobicoke, Ontario M9P 3V6
Canada


ONTARIO WATER RESOURCES COMMISSION